

The juvenile-adult color shift coincides with an ontogenetic shift in foraging behavior; juveniles remain on single colonies, but adults move regularly between colonies. Juveniles therefore behave as extreme trophic specialists and adults as trophic generalists. The spots on the mantle may become more clearly outlined when *Cyphoma* develop the "diet mixing" behavior of an adult and ingest several species of gorgonian during a brief time interval. This supports the notion that coloration is affected by ingestion of prey pigments.

The association of trophic specialization and cryptic coloration described for juvenile *Cyphoma* occurs in other trophic specialists. Trophic specialization may be a precondition favoring the evolution of cryptic coloration in many carnivorous molluscs and other taxa. Exceptions to the association of trophic specialization and cryptic coloration within the order Nudibranchia are common among species that feed upon prey possessing toxic chemicals; these species appear to be warningly colored and may incorporate toxins from their prey.

**THE CALLIOSTOMA PULCHRUM SPECIES COMPLEX IN THE NORTHERN WESTERN ATLANTIC.** James F. Quinn, Jr., Florida Department of Natural Resources, Bureau of Marine Research, St. Petersburg.

Apparent intergrades in shell morphologies between *Calliostoma pulchrum* (C. B. Adams, 1850) and *C. roseolum* Dall, 1881, prompted a reexamination of the *C. pulchrum* species complex within the northern Western Atlantic. Five distinct forms were evaluated: *C. pulchrum* (Caribbean), *C. roseolum* (southeastern U.S.), *C. apicinum* Dall, 1881, *roseolum* (Barbados), *C. veliei* Pilsbry, 1900 (southeastern U.S.), and an unnamed form (Texas).

**UPDATE ON MOLLUSKS WITH INDO-PACIFIC FAUNAL AFFINITIES IN THE TROPICAL EASTERN PACIFIC II.** Donald R. Shasky, Redlands, California.

Cocos Island, Costa Rica, 300 miles SSW of Puntarenas C.R., is the largest uninhabited island in the world. It has a land mass of 20 square miles. Its annual rainfall is 22 feet.

Recent diving has produced specimens of the following Indo-Pacific mollusks previously unreported in the Panamic Province:

- Viriola abbotti* (Baker and Spicer, 1935)
- Scalenostoma subulata* (Broderip, 1832)
- Cypraea talpa* (Linnaeus, 1758)
- Cypraea* nsp. Burgess, 1983
- Charonia tritonis* (Linnaeus, 1758)
- Favartia garretti* (Pease, 1869)
- Persicula pulchella* (Kiener, 1834)
- Spondylus nicobaricus*, Schreiber, 1793

The *Cypraea* nsp. Burgess, 1983, is in press. It ranges throughout much of the Indo-Pacific.

**PALEOECOLOGY AND MOLLUSCAN FAUNA OF THE ESMERALDAS FORMATION OF ECUADOR.** Gary Rosen-

berg, Mollusk Department, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

A collection of mollusks from the Esmeraldas Formation containing 165 species was analysed. About 100 of these species are new records for the Esmeraldas, increasing the number of species known in the fauna to about 260. Most of the new records are of species a centimeter or less in length.

Ecological comparisons of Recent taxa related to the fossil species show that the fauna lived offshore on the continental shelf on a mud substratum in water 50 to 100 meters deep.

Studies of the planktonic foraminiferal fauna restrict the age of the Esmeraldas to 3.6 to 3.2 myBP, corresponding to early Late Pliocene. The Esmeraldas was previously assigned to the late Miocene or early Pliocene by workers using the Lyellian system of dating, as almost 80 percent of the species in the fauna are extinct. The Lyellian system gives dates that are too old as it fails to take into account the increased extinction rates caused by the uplift of the Panamanian landbridge, and by glacially controlled fluctuations in sea level.

**TERTIARY MOLLUSCAN DISTRIBUTIONS FROM BAJA CALIFORNIA SUR, MEXICO.** Judith Terry Smith, U.S. Geological Survey, Menlo Park, California.

Molluscan data provide valuable information on the geologic history of the Gulf of California and the paleogeographic reconstruction of Baja California. Marine waters first entered the southern part of the Gulf about 5 m.y. ago, and the fauna has been the same since the middle Pliocene. The Baja California peninsula is composed of a mosaic of geologic terranes, each with a distinctive stratigraphic and tectonic history. Some terranes (e.g., the Viscaïno peninsula) may have traveled far; others are autochthonous within the Pacific-Panamic faunal province. Fossiliferous strata that overlie adjacent terranes constrain the time they came together. First occurrences of exotic taxa, provincial extinctions, and phylogenetic sequences of index species are used to date and correlate formations in the Viscaïno peninsula, the Magdalena Plain, the Purisima area, the Cabo Trough, and the Gulf of California.

Newly collected fossils indicate that major revisions are necessary in the age assignments of earlier literature. Miocene mollusks typical of a mangrove environment were collected in the Cabo Trough from the basal part of the Trinidad Formation, which was previously regarded as a deep-water deposit. Miocene taxa from the type section of the "Pliocene" Salada Formation are correlative with the middle Miocene Gatun Formation of Panama. A Miocene strandline is preserved near Todos Santos, where nonmarine vertebrate fossils overlie beach deposits containing *Vasum* sp. cf. *V. pufferi*, *Turritella abrupta*, and *Cancellaria* (*Pyruclia*) sp. cf. *C. (P.) diadela*. Caribophile *Melongena melongena consors*, *Cymia cheloma*, and *Turritella* 5 spp. document that Tertiary Caribbean Province index fossils of middle Miocene age occur in Baja California. Caribbean species also occur